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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/206,216 12/05/98 DATH

J F-721

IM22/1010

EXAMINER

FINA TECHNOLOGY, INC  
JIM WHEELINGTON  
P O BOX 410  
DALLAS TX 75221

NGUYEN, T

ART UNIT	PAPER NUMBER
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1764

*13*

DATE MAILED:

10/10/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

<b>Office Action Summary</b>	Application No. <b>09/206,216</b>	Applicant(s) <b>Dath et al.</b>
	Examiner <b>Tam Nguyen</b>	Group Art Unit <b>1764</b>

Responsive to communication(s) filed on Jul 31, 2000

This action is **FINAL**.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

#### Disposition of Claims

Claim(s) 1, 2, 4-10, 12-14, 16-20, 24, and 27 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

Claim(s) \_\_\_\_\_ is/are allowed.

Claim(s) 1, 2, 4-10, 12-14, 16-20, 24, and 27 is/are rejected.

Claim(s) \_\_\_\_\_ is/are objected to.

Claims \_\_\_\_\_ are subject to restriction or election requirement.

#### Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

The proposed drawing correction, filed on \_\_\_\_\_ is  approved  disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All  Some\*  None of the CERTIFIED copies of the priority documents have been

received.

received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## **DETAILED ACTION**

### ***Response to Amendment***

The rejection of claims 1, 2, 4, 7-10, 12, 22, and 27 under 35 USC § 102(b) as anticipated by EP 0109060 is withdrawn by the examiner in view of the amendment filed on July 31, 2000.

Since a new non-final rejection follows, the applicant's arguments will not be addressed.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 68 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 7-10, 12-14, 24, and 27 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of copending Application No. 09/206,208. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process

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does not disclose that the catalyst is an **MFI** crystalline silicate catalyst. However, the crystalline catalyst of the present claimed process has the same characteristics as the **MFI** crystalline silicate catalyst of the process of claims 1-10. Therefore, the present claimed catalyst is the **MFI** crystalline silicate.

Claims 1, 2, 4-10, 12-14, 16, 17, 20, 24, and 27 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09/206,207. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is an **MFI** crystalline silicate catalyst or ZSM-5 and does not disclose that the feed contains at least one sulfur, nitrogen, and/or oxygen derivative impurity. However, the crystalline catalyst of the present claimed process has the same characteristics as the **MFI** which is ZSM-5 of the process of claims 1-16. Therefore, the present claimed catalyst is ZSM-5 and it would be expected that the results would be the same when using the feed of claims 1-16 for the present claimed process because both claimed processes use the same catalyst and operate under the same conditions.

Claims 1, 2, 4-10, 12-14, 24, and 27 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09/206,218. Although the conflicting claims are not identical, they are

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not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is an MFI crystalline silicate catalyst. However, the crystalline catalyst of the present claimed process has the same characteristics as the MFI crystalline silicate catalyst of the process of claims 1-16. Therefore, the present claimed catalyst is the MFI crystalline silicate.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 U.S.C. § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7-10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0109060.

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The EP 0109060 reference discloses a process of cracking a hydrocarbon feed which comprises olefins having 4 to 12 carbon atoms into propylene and some ethylene. The feed is contacted with an alumino-silicate having a crystalline and zeolitic structure. The process is conducted at a temperature of from 400<sup>0</sup> C to 600<sup>0</sup> C, at a substantially atmospheric pressure, and

at a space velocity of from 5 to 200  $\text{h}^{-1}$ . The behavior of the silicalites depends on the conversion pressure. If the pressure is atmospheric, the space velocity must be lower than 50  $\text{hr}^{-1}$ . If the pressure is from 1.5 to 7.5 atmospheres, the space velocity must be above 50  $\text{hr}^{-1}$ . The examples indicate selectivity of  $\text{C}_4$  saturated compounds of less than 5 wt %. Therefore, at least 95% of the  $\text{C}_2$  and  $\text{C}_3$  compounds present in the product must be olefins. The data in the table also indicates that propylene yield is within the claimed range and indicate that olefin contents of the feed and product are within  $\pm 15$  % of each other. It is noted that the reference does not specifically disclose a ratio of silicon/aluminum between 180 and 1000. However, the reference discloses that the catalyst has a  $\text{SiO}_2/\text{Al}_2\text{O}_3$  molar ratio equal to or greater than 350 (this is equivalent to silicon/aluminun atomic ratios of equal to or greater than 175). Therefore, the examiner's position is that the claimed ratio of silicon/aluminum is embraced by the reference. (See page 1, lines 20-35; page 3, lines 18-40; page 5, lines 13-19; pages 6-7; claims 1-3)

***Claim Rejections - 35 U.S.C. § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4-6, 13, and 14 are rejected under 35 U.S.C. 103(a) as obvious over EP

0109060.

The EP 0109060 reference discloses a process of cracking a hydrocarbon feed which comprises olefins having 4 to 12 carbon atoms into propylene and some ethylene. The feed is contacted with an alumino-silicate having a crystalline and zeolitic structure and having a  $\text{SiO}_2/\text{Al}_2\text{O}_3$  molar ratio equal to or greater than 350. This is equivalent to silicon/alumimun atomic ratios of equal to or greater than 175. The process is conducted at a temperature of from

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400<sup>0</sup> C to 600<sup>0</sup> C, at a substantially atmospheric pressure, and at a space velocity of from 5 to 200 h<sup>-1</sup>. The behavior of the silicalites depends on the conversion pressure. If the pressure is atmospheric, the space velocity must be lower than 50 hr<sup>-1</sup>. If the pressure is from 1.5 to 7.5 atmospheres, the space velocity must be above 50 hr<sup>-1</sup>. The examples indicate selectivity of C<sub>4</sub> saturated compounds of less than 5 wt %. Therefore, at least 95% of the C<sub>2</sub> and C<sub>3</sub> compounds present in the product must be olefins. The data in the table also indicates that propylene yield is within the claimed range and indicate that olefin contents of the feed and product are within ± 15 % of each other. (See page 1, lines 20-35; page 3, lines 18-40; page 5, lines 13-19; pages 6-7; claims 1-3)

Regarding claim 1, the EP reference does not specifically disclose that the atomic ratio of silicon to aluminum is from 180 to 1000. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP catalyst by using a catalyst having an atomic ratio of silicon to aluminum of 180 because the EP reference discloses that a catalyst having an atomic ratio of silicon to aluminum greater than 175 can be used in the process.

Regarding claims 4-6, the reference does not disclose that the feedstock comprises light cracked naphtha or is selected from a C<sub>4</sub> or C<sub>5</sub> cut from a steam cracker. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by having the feedstock from a source as claimed because the

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claimed feeds are chemically and physically similar to the feeds disclosed in EP 0109060 and therefore would be expected to behave similarly in the process of EP 019060 as the disclosed feeds.

Regarding claims 13 and 14, the reference does not specifically disclose the olefin partial pressures. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by utilizing the claimed olefin partial pressure because the EP 0109060 reference discloses pressures that overlap those claimed and discloses that the pressure is a result effective variable.

Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0109060 as applied to claims 1, 2, 4-6, 13, and 14 above, and further in view of Cosyns et al. (5,306,852).

The EP 0109060 reference does not specifically disclose that the feed contains dienes, and does not disclose the step of hydrogenation of dienes.

Cosyns discloses a hydrogenation process in which a diolefin (or diene) containing hydrocarbon fraction produced by steam cracking or other cracking processes is hydrogenated. The dienes are converted into mono-olefins by contacting with a hydrogenation catalyst. (See abstract)

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Regarding claims 16, 17 and 20, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by utilizing a feed similar to the claimed feed in the process of EP 0109060 and hydrogenating dienes in the feed because Cosyns discloses that dienes (undesirable substances) will be converted to mono-olefins in a hydrogenation process. Also, it would be expected that the results would be similar or the same when using the claimed feed in the EP process because of the similarities between the claimed feed and the EP feed.

Regarding claims 18, 19 and 20, Cosyns does not specifically disclose the LHSV of the feedstock and the hydrogenation operating conditions. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Cosyns process by utilizing the LHSV and the operating conditions as claimed because Cosyns utilizes a hydrogenation catalyst to convert dienes in a hydrocarbon stream, which is from the same sources as claimed, to mono-olefins. Therefore, it would be expected that the results would be similar or the same when operating the Cosyns process under the claimed conditions.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 010960 and Cosyns et al. (5,306,852) as applied to claim 20, and further in view of Gajda et al. (5,522,984).

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EP 010960 reference does not specifically disclose the step of pretreating the catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Gajda discloses a de-aluminating process of a cracking catalyst by steaming the catalyst and then contacting the steamed catalyst with an aqueous solution. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 010960 process by pre-treating the catalyst as taught by Gajda because the Gajda catalyst pretreating step will produce a catalyst having a desirable silicon/aluminum ratio. (See Gajda, col. 3, lines 13-49; col. 4, lines 43-49)

Alternatively, claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 010960 and Cosyns et al. (5,306,852) as applied to claim 20 above, and further in view of Kuehl et al. (4,954,243).

EP 010960 reference does not specifically disclose the step of pretreating catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Kuehl discloses the dealumination of zeolites which are used in catalytic cracking to result in zeolites that can have silica: alumina mole ratios of 30,00 or greater. The dealumination can occur by calcination in the presence of water followed by treatment with a complexing agent. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 010960 process by dealuminating the zeolite to achieve the desired silicon:aluminum atomic ratio as suggested by Kuehl because the zeolite will exhibit very low

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coke make thereby allowing very long times on stream between regenerations. (See Kuehl, col. 3, lines 44-65; col. 4, lines 15-28; col. 8, lines 65-68; col. 9, lines 11-17 and 55-68; col. 10, lines 1-5; col. 11, lines 27-68; col. 12, lines 1-7 and 48-58)

Claims 1, 2, 4-6, 9, 10, 13, 14, 16, and 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0534142.

The reference discloses a process for converting a feed comprising a light cracked naphtha (e.g., light gasoline, C<sub>4</sub> cut, C<sub>5</sub> cut) and C<sub>4</sub> olefins to lighter olefins by contacting the feed with a crystalline silicate catalyst having a ratio of silicon to aluminum of 200. The process is operated at a temperature from about 500 to about 900° F (260 to 482° C) and at a pressure between 0.0 and 150 psig (0.0 to 10.3 bars). The feed contains about 0.1% of diolefins. From the data in the tables, it is calculated that more than 95% of C<sub>2</sub> to C<sub>3</sub> compounds present in the product stream are C<sub>2</sub> to C<sub>3</sub> olefins. The data in the tables also indicate that propylene yield is within the claimed range and indicate that olefin contents of the feed and product are within ± 15% of each other. (See page 3, line 39 through page 4, line 41; pages 11-18).

Regarding claims 1 and 27, the EP 0534142 reference does not disclose that the cracking temperature is from 500 to 600° C. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0534142 process by operating the process at temperature of 500° C because the reference discloses that the process

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can be operated at a temperature up to **about** 482<sup>0</sup> C. Therefore, it would be expected that the outcome would not be affected when operating the EP 0534142 process at 500<sup>0</sup> C because of the similarities between the two processes in terms of their feedstock.

Alternatively, it has been held by the patent law that the selection of reaction parameters such as temperature and concentration would have been obvious. More particularly, where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller* 105 USPQ 233, 255 (CCPA 1955). *In re Waite* 77 USPQ 586 (CCPA 1984). *In re Scherl* 70 USPQ 204 (CCPA 1946). *In re Irmscher* 66 USPQ 314 (ccpa 1945). *In re Norman* 66 USPQ 308 (CCPA 1945). *In re Swenson* 56 USPQ 372 (CCPA 1943). *In re Sola* 25 USPQ 433 (CCPA). *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Regarding claim 1, the EP0534142 does not specifically disclose that the feedstock is passed over the catalyst at an LHSV of 10 to 30hr<sup>-1</sup>. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0534142 process by passing the feedstock over the catalyst at an LHSV as claimed because of the similarities between the EP 0534142 process and the claimed process. Therefore, it would be expected that the outcome would be similar or the same when operating the process at an LHSV of 10 to 30h<sup>-1</sup>.

Regarding claims 13 and 14, the reference does not specifically disclose the olefin partial pressures. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0534142 process by utilizing the claimed olefin partial pressure because the EP 0534142 reference discloses pressures that overlap those claimed and discloses that the pressure is a result effective variable.

Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0534142 as applied to claims 1, 2, 4-6, 9, 10, 13, 14, 16, and 27 above, and further in view of Cosyns et al. (5,306,852).

The EP 0534142 reference does not specifically disclose that the feed contains dienes and does not disclose the step of hydrogenation of dienes.

Cosyns discloses a hydrogenation process in which a diolefin (or diene) containing hydrocarbon fraction produced by steam cracking or other cracking processes is hydrogenated. The dienes are converted into mono-olefins by contacting with a hydrogenation catalyst. (See abstract)

Regarding claims 17 and 20, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0534142 process by hydrogenating dienes in the EP 0534142 feed because Cosyns discloses that dienes (undesirable substances) will be converted to mono-olefins in a hydrogenation process.

Regarding claims 18, 19 and 20, Cosyns does not specifically disclose the LHSV of the feedstock and the hydrogenation operating conditions. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Cosyns process by utilizing the LHSV and the operating conditions as claimed because Cosyns utilizes a hydrogenation catalyst to convert dienes in a hydrocarbon stream, which is from the same sources as claimed, to mono-olefins. Therefore, it would be expected that the results would be similar or the same when operating the Cosyns process under the claimed conditions.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP0534142 and Cosyns et al. (5,306,852) as applied to claim 20 above, and further in view of Gajda et al. (5,522,984).

EP 010960 reference does not specifically disclose the step of pretreating the catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Gajda discloses a de-aluminating process of a cracking catalyst by steaming the catalyst and then contacting the steamed catalyst with an aqueous solution. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0534142 process by pre-treating the catalyst as taught by Gajda because the Gajda catalyst pretreating step will produce a catalyst having a desirable silicon/aluminum ratio. (See Gajda, col. 3, lines 13-49; col. 4, lines 43-49)

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Alternatively, claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 010960 and Cosyns et al. (5,306,852) as applied to claim 20 above, and further in view of Kuehl et al. (4,954,243).

EP 010960 reference does not specifically disclose the step of pretreating catalyst by steam and de-aluminating so as to increase the silicon/aluminum ratio. However, Kuehl discloses the dealumination of zeolites which are used in catalytic cracking to result in zeolites that can have silica: alumina mole ratios of 30,00 or greater. The dealumination can occur by calcination in the presence of water followed by treatment with a complexing agent. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 010960 process by dealuminating the zeolite to achieve the desired silicon:aluminum atomic ratio as suggested by Kuehl because the zeolite will exhibit very low coke make thereby allowing very long times on stream between regenerations. (See Kuehl, col. 3, lines 44-65; col. 4, lines 15-28; col. 8, lines 65-68; col. 9, lines 11-17 and 55-68; col. 10, lines 1-5; col. 11, lines 27-68; col. 12, lines 1-7 and 48-58)

***Conclusion***

In the view of the foregoing, the claims have failed to patentably distinguish over the applied art.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tam Nguyen, whose telephone number is (703) 305-7715. The examiner

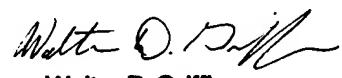
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can normally be reached on Monday-Thursday from 7:15 AM to 5:45 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knodel, can be reached on (703) 308-4311. The fax phone number for this Group is (703) 305-3599.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

T. M. Nguyen  
October 5, 2000

  
Walter D. Griffin  
Primary Examiner